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A Chilean Educational Initiative to Mitigate the Impact on Mathematics Learning in Grade 1 Students During the Covid-19 Lockdown

Una iniciativa educativa chilena para atenuar el impacto en el aprendizaje de matemática en estudiantes del grado 1 durante el aislamiento social por Covid-19

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Abstract

The social distancing measures that were imposed as a result of the Covid-19 pandemic, led many countries to adopt distance education. In Chile, a group of teachers sought to support children's education, and with the combined efforts of parents, teachers and administrators took up the challenge of how to help children continue learning in such an adverse environment. To this end, an open-access television program, specifically to support daily math for grade 1 children, was created. The program, which was available on the Internet, comprised fifty-seven video clips based on the official school text and tutor-student interaction. The present paper reports on this initiative and its outcomes.

Keywords: Math learning, COVID-19, grade 1, television, primary education

1. Introduction

The extreme decision to close schools and the lockdown caused by COVID-19 impacted the continuity of school learning and the socio-emotional environments of families. Most schools in Chile were practically closed except to deliver educational resources and food to those in need, with teachers working rotating shifts. The collaborative efforts between authorities, teachers and parents to try to meet the requirements to educate did not seem sufficient and there were proactive initiatives and experiences – such as the TV Program *Sin Tiza* – that sought to support this collaboration.

The creation of the televised pedagogical space *Sin Tiza*, hereinafter Program, gave rise to the development of fifty-seven video clips as an orientation tool for parents, teachers and educators who supported the study of mathematics at home for grade 1 students. Each of these sequential videos addressed one or two activities associated with a new knowledge or skill, according to the textbook distributed to Chilean schools by the Ministry of Education of Chile (MINEDUC), which is a school textbook following the Japanese essence and that recently was adapted to the Chilean reality. The editor of the textbook for grade 1 is Masami Isoda, who collaborates with the Chilean Government since 2006 and maintains academic collaboration with the researchers of this project, both as co-author of books (Isoda and Olfos 2020) and school textbooks from grades one to fourteen (Isoda and Estrella 2020), as well as with long-standing Lesson Study academic exchanges, documented in Olfos, Isoda and Estrella (2020).

The educational impact of COVID-19 has been addressed by OECD, UNESCO and in particular by the Organization of Ibero-American States (OEI[1]). One of the authors of this article, current president of the Society of Mathematical Education of Chile (SOCHIEM[2]) and representative of the country in the Ibero-American Federation of Mathematical Education Societies (FISEM[3]), leader of this organization and founder of the Lesson Study Group (GEC PUCV), developed a plan to support the continuity of educational service provision through alternative modalities during the lockdown period in order to mitigate the educational impact of the pandemic. In this way, Masami Olfos started and led the coordination of the Program *Sin Tiza* with GEC PUCV, who developed this original and multimodal line, which seeks to simultaneously support teachers and students with the

integration of audio-visual communication and processing tools. The Program was presented in a virtual meeting with teachers during the pandemic (see Fig. 1) and had more than 13,000 views within days of its appearance (see *Sin Tiza*, YouTube).

Fig. 1: Presentation of the initiative in meeting with teachers

The objective of this report is to give an account of the characteristics of the Program that supports mathematics learning, taking into account the socio-affective dimension of children in grade 1 of elementary school, which strengthened the interaction of parents and students, in the region of Valparaíso, Chile. In particular, it describes the characteristics of a sequence of fifty-seven video clips based on mathematics lesson plans developed by teachers and researchers, promoting the teaching and learning of mathematics in grade 1, for its massive use in local school communities through online management (asynchronous mode) and/or open TV (synchronous mode).

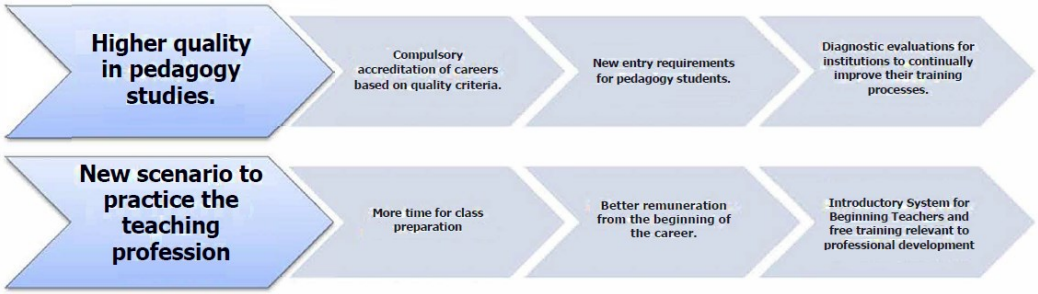
2. Background

The restrictions caused by social distancing in the current pandemic have impacted education at all school levels, and will continue to do so for several months, as students and teachers cannot meet in person in schools. Some exceptional countries, such as Japan, have a responsive and disciplined citizenry that allow the reduction of the educational impact by the COVID-19 pandemic. However, this impact will be more severe in developing countries, with vulnerable populations, such as Chile, and in countries with more precarious health infrastructures.

Limitations in the ability to meet during a prolonged pandemic will likely limit opportunities for students to learn during this period of social distancing. Literature has indicated that the time dedicated to learning is one of the most reliable predictors of the opportunity to learn. For example, in the United States, researchers have documented the effects of learning loss during the summer season, showing that prolonged interruption of studies causes not only a suspension of learning time, but also a loss of knowledge and acquired skills, loss that is greater in mathematics and in students from low-income families (Reimers and Schleicher 2020).

Comparatively, Japan and Chile are similar in terms of the percentage of students who have access to a quiet place to study, but they differ in access to a computer for schoolwork, Chile offers more computers for them (OECD PISA 2018). In the same PISA study, another difference between both countries that is relevant in virtual education is that in Chile the percentage of students in schools whose Director agrees or strongly agrees that teachers have the technical and pedagogical skills necessary to integrate digital devices in teaching is higher (over 60% and above the OECD average, while in Japan it is less than 30%, the lowest percentage of all the surveyed countries).

In Chile, the achievement of curricular objectives by the student population has been persistently a challenge for the government. The levels of achievement, although higher at the Latin American context, remain insufficient worldwide, and the levels do not increase despite different strategies such as: curricular innovation, teacher incentives, textbook policies and preferential subsidy law. In addition, a recent teaching career law has been enacted to encourage the arrival of better professionals to the educational system, see Fig. 2 (Estrella and Zakaryan 2020).



(source: Estrella and Zakaryan 2020)

Fig. 2: Some proposals in the Professional Teacher Development System

However, the strike from teachers and then students, the social outbreak of October 2019 and finally the pandemic, exacerbate this problem in Chile. But, extraordinarily, the confinement could constitute an opportunity to support the school population, by having new communication technologies, unusual closeness of parents to students, and collaborative work between supporters, teachers, and parents for an unforeseen pedagogical management. Synergies that could generate, from this Program, learning in mathematics under a good socio-emotional context for a significant portion of grade 1 students.

The Program and the school textbook for grade 1 adopt the problem solving approach in mathematics and the socio-affective development of the student, which is also fostered by the curricula of Japan, Singapore, Finland, among other countries; and they promote it through video clips that were created from carefully designed Lesson Plans. It is expected that by programing this TV Program for fifty-seven consecutive days and using the school textbook delivered by the school, the student will gradually gain autonomy, and while entertaining him/herself, develop mathematical thinking. In addition, in Chile, the context of open TV makes it possible to contribute with justice to social development, reaching children from the most remote and vulnerable sectors of the country, who may not have Internet connection and the support of their parents, or lack resilience, learning strategies, and the commitment to learn by and for themselves.

Within the constraining framework imposed by this new virtual educational scenario, the TV Program is based on the cooperation of parents and teachers in our country, who accompany the student's teaching at home. However, although parents recognize the learning objectives of grade 1, it is necessary to implement teaching without misleading students towards mistakes or sub-understanding. For this reason, the video clips were created so that the parent and the teacher accompany, give confidence and support to the child, appropriately developing the mathematical learning that is promoted in them, favouring the habit of daily study, at an established time and place.

3. Research Question

As has been argued, this study raises the question, how to promote mathematical learning in the context of this pandemic? More specifically, what characteristics

define the TV Program that seeks mathematical learning in a pleasant, challenging and stress-free socio-affective climate?

4. Methodology

4.1 Subjects

Fifty-six informants participated in the exploration of the characteristics of the Program *Sin Tiza*, among them, two members of the production team, and two groups of grade 1 teachers.

4.2 Instruments and procedures

Two members of the production team responded to a questionnaire in which they were asked to specify the educational and technical characteristics of the Program.

The first group of teachers was composed by thirteen teachers that participated in an online group interview. They came from a group of thirty teachers that participated in the virtual meeting that made the Program known in the month of May. The main focus of the interview was to learn about the teaching experiences through the use of the video clips and the aspects that could or could not be assessed for its teaching application.

The second group of teachers, composed by forty-one teachers, responded to a survey that was sent by email to more than a hundred teachers who were teaching grade 1 in different regions of the country and were participating in a course to support vulnerable schools offered by the University at the time the Program *Sin Tiza* started. This survey inquired about the use of the Program *Sin Tiza* and the resources they employed (as of June 2020) to support the education of students through alternative media such as the Program on open TV.

The data analysis was carried out from the results of the questionnaire, attending to the objective of characterizing the Program. It should be noted that this entire process was carried out during the pandemic, hindering the direct access to teachers, students and parents.

The information obtained through the data collection techniques is presented in the corresponding order described in the methodology.

5. Educational TV Program *Sin Tiza*

The Program was developed in fifty-seven video clips with a duration of seven to ten minutes within the framework of lesson plans designed with the *Teachers Didactic Guide* of Ministry of Education (MINEDUC). In the script of the clips, problems were considered for the student and possible returns from the teacher, in order to enrich the tutor-student socio-affective relationship; it also included parent-student interaction, online challenges for the student-viewer, and a playful environment that would enrich their math learning.

The Program *Sin Tiza* issued its first episode on Monday, April 13, 2020 (less than a month after schools were closed in Chile, which occurred on March 16 of the same year) with the support of the Institute of Mathematics (IMA) of the Pontificia Universidad Católica de Valparaíso and the open television channel UCV3, through UCV3 screens, which transmits twenty-four hours a day on digital terrestrial frequencies 4.3 in Valparaíso, 5.3 in Santiago, and online at www.ucv3.cl. The Program was broadcast from Monday to Friday in two occasions, at 10:00 a.m. and 11:30 a.m., with a repetition of all the weekly chapters on Saturday at 11:00 a.m. The weekly work of the fourteen-person team, which produced five weekly videos, started in mid-March 2020 and ended in July of the same year.

Once the clips were built, they were inserted into an open TV Program, being available on the Internet and on a website with an organized structure according to the clips and materials. The Program aired during the months of April to July, and sought to support students and their teachers who teach mathematics.

In each clip, feedback was provided to teachers for monitoring and supporting students, visible post-its, brands, highlights and multimodality were embedded. The evaluation was guided with an exit ticket, ending with the invitation to interact through communication via email, Instagram or website.

The way in which the program reached the children and parents varied from the traditional modality of a television series followed predominantly on a daily basis,

to a peculiar and varied form established by the teachers based on the context in which they work, as reported by the teachers in the group interview or through the questionnaire.

UCV television records show that the program was being received by 50,000 receivers, which we call the synchronous way. On the other hand, there is an access record to the repository of videos on YouTube. This would be used by teachers to prepare their classes or as input material to be forwarded to parents, which we call the asynchronous way. The following graph shows the total visits made to the fifty-seven clips of *Sin Tiza* on YouTube until the end of July. This data record shows how the clips hosted on YouTube, accessed through the UCV3 or GEC sites, have been and continue to be visited.

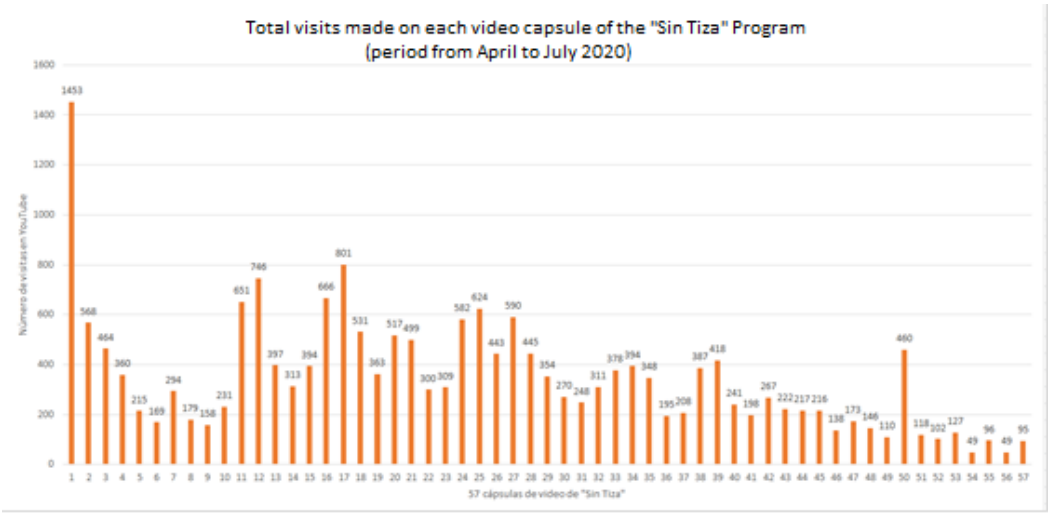


Fig. 3: Total visits made on each video clip of the TV Program *Sin Tiza*

6. Results

The responses (forty-three in total) were received between June 22nd and the end of June, indicating that only twenty-one teachers had previously known about the Program *Sin Tiza* (See Figs. 4, 5 and 6). In addition, fifteen written responses to questions about the use of the Program by the teachers were recorded.

The responses of the teachers indicate that the initiative is a good teaching material, valuing the clarity with which the activities are carried out and the treatment of the speaker towards the audience:

> L. B., grade 1 teacher points out: "It goes according to the units [Curricular] they serve as explanatory clips to clarify doubts or how to apply the strategy."

> V. C., another of the surveyed teachers indicates: "[values] the didactics in the way of delivering the contents and the figure of the child is very important since it motivates others to carry out the activities."

Among the aspects for improvement of the Program, of the fifteen responses, half indicate that they have no suggestions. The rest of the opinions are divided into trying to extend the Program to homes without Internet connection and to give more support to parents:

> Y.O. indicates: "That the chapter served so that the students could do the activities at the same time as the chapter, and to follow the order proposed by the Ministry [of Education], since sometimes parents get a bit entangled in that and also they see it and then do the activities ... because they show the child and you don't really notice what he is doing and you have to wait for him to see it and that confuses the parents who have a harder time understanding."

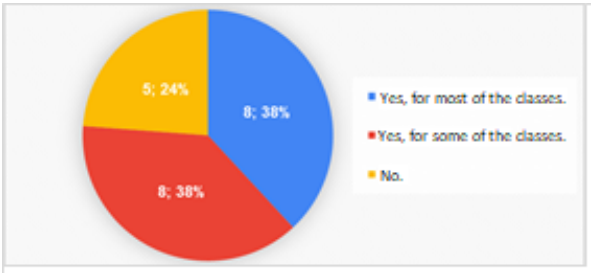


Fig. 4: Are you using the Program *Sin Tiza* to make your math classes?

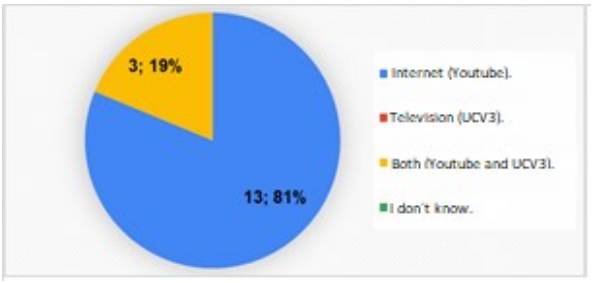


Fig. 5: How do your students access the Program *Sin Tiza*?

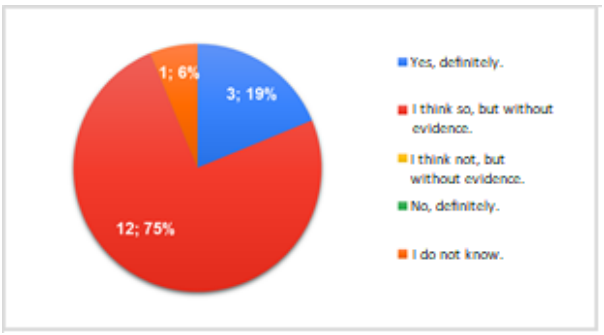


Fig. 6: Do you consider that students have achieved learning with the Program *Sin Tiza*?

7. Discussion and Conclusions

The low number of responses received to the survey is a direct consequence of the difficulties inherent to the pandemic and the difficulty of widely disseminating the initiative. In the current state of confinement and remote work, together with closed school establishments, it is difficult to directly contact the administrators of corporations or schools.

Regarding the results, it can be seen that from 100% of the respondents, only 37.2% used the Program *Sin Tiza*, most of them for three to five weeks until the time of conducting the survey. Only 18.6% indicated that they use the Program regularly. The main medium in which they accessed the Program was through the Internet. There was no respondent who indicated that they saw the Program *Sin Tiza* only from open TV (a fixed schedule in the mornings). There are also many comments that suggest the possibility to bring this Program to children who do

not have access to Internet, despite the fact that the Program was transmitted through the open digital signal of UCV3, which is consistent with none of the respondents watching the program on television.

The survey sought to investigate the characteristics of the TV Program linked to mathematical learning in a pleasant, challenging and stress-free socio-affective climate. The responses indicate a good reception of the initiative, considering it a valuable element to complement the math classes that teachers must carry out. The written arguments of teachers who used the resource indicate that the Program was a contribution to education in the days of COVID-19, although in practice, there was a privileged access to the Program *Sin Tiza* through the Internet and not through broadcast TV.

This educational experience, although well evaluated, has among its projections to continue with a follow-up process to qualitatively evaluate its usage and record essential aspects that allow it to be implemented with improvements in the future.

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[1] Organización de Estados Iberoamericanos (OEI)
[2] Sociedad Chilena de Educación Matemática (SOCHIEM)
[3] Federación Iberoamericana de Sociedades de Educación Matemática (FISEM)

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Resources

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